



Programmer Guide

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Cypress Semiconductor
3901 North First Street
San Jose, CA 95134
Phone (USA): 800.858.1810
Phone (Intl): 408.943.2600
<http://www.cypress.com>

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Cypress is willing to work with the customer who is concerned about the integrity of their code. Code protection is constantly evolving. We at Cypress are committed to continuously improving the code protection features of our products.

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1. Introduction



This document describes the installation and use of Cypress' PSoC[®] Programmer software. This software is used as a standalone application to program PSoC devices through the use of Intel HEX files. It can also be launched from within PSoC Designer to program a device from an open project.

If the information in this guide is not sufficient to resolve any issues while using PSoC Programmer, use the support resources listed in the next section.

1.1 Support

Free support for PSoC Programmer is available online at <http://www.cypress.com/psoc>. Resources include Training Seminars, Discussion Forums, Application Notes, PSoC Consultants, TightLink Technical Support Email/Knowledge Base, and Application Support Technicians.

Technical Support is also available by phone at 1-800-541-4736.

Before using Cypress support services, know the version of PSoC Programmer installed on your system. To determine the version, build, or service pack of PSoC Programmer, click Help > About PSoC Programmer.

1.2 Product Upgrades

Cypress provides scheduled upgrades and version enhancements for PSoC Programmer free of charge. You can download them directly from www.cypress.com under Software and Drivers. Also provided are critical updates to system documentation under Design Resources or go to the Design Resources section at <http://www.cypress.com/psoc>.

1.3 Document Revision History

Document Title: Programmer User Guide				
Document No.: 011-16213				
Revision	ECN #	Print Date	Origin of Change	Description of Change
1.0	NA	09/01/2004	HMT	New document.
1.17	NA	12/01/2004	-	Support for additional devices and minor fixes.
1.55	NA	08/18/2005	SFV	Implemented new Cypress logo and format along with minor edits.
2.20	NA	06/02/2006	VED	Added images to illustrate the text. Added new information.
**	2504769	5/15/2008	FSU	The entire GUI was redesigned and updated, so most of the document was significantly re-written to document the new interface.
*A	2507305	5/22/2008	FSU	Fix for defect number 25471.
*B	2564710	09/10/2008	SFV	Fixed revision to *B on page documents.
*C	2794391	10/29/2009	PYRS	Several updates
Distribution: External/Public				
Posting: None				

1.4 Documentation Conventions

Convention	Usage
Courier New	Displays file locations, user entered text, and source code: C:\...cd\icc\
<i>Italics</i>	Displays file names and reference documentation: Read about the <i>sourcefile.hex</i> file in the <i>PSoC Designer User Guide</i> .
[Bracketed, Bold]	Displays keyboard commands in procedures: [Enter] or [Ctrl] [C]
File > Open	Represents menu paths: File > Open > New Project
Bold	Displays commands, menu paths, and icon names in procedures: Click the File icon and then click Open .
Text in gray boxes	Describes Cautions or unique functionality of the product.

1.5 Acronyms

The following are acronyms used throughout this user guide.

Acronym	Description
DRC	design rule checker
EPP	enhanced parallel port
ICE	in-circuit emulator
IDE	integrated development environment
SSC	system supervisory call

2. Installation



PSoC Programmer may be downloaded directly from the Cypress web site at <http://www.cypress.com>.

PSoC Programmer is compatible with PSoC Designer version 4.4 or later.

2.1 Setup

You cannot install more than one version of PSoC Programmer on the same computer. Uninstall any previous version before installing a new version.

Downloading and Installing from Cypress Web Site:

1. Go to <http://www.cypress.com/psocprogrammer>.
2. Locate **PSoCProgrammer n.zip** and download the file.
3. Use any ZIP compatible program to open the PSoC Programmer installation package.
4. Click *PSoCProgrammer.exe* to start the setup wizard.
5. Follow the on screen prompts to install PSoC Programmer.

If an earlier version of PSoC Programmer is already installed, the Setup Wizard prompts you to delete the older version. After you uninstall the previous version repeat steps 4 and 5 to install the latest version.

3. Using Programmer



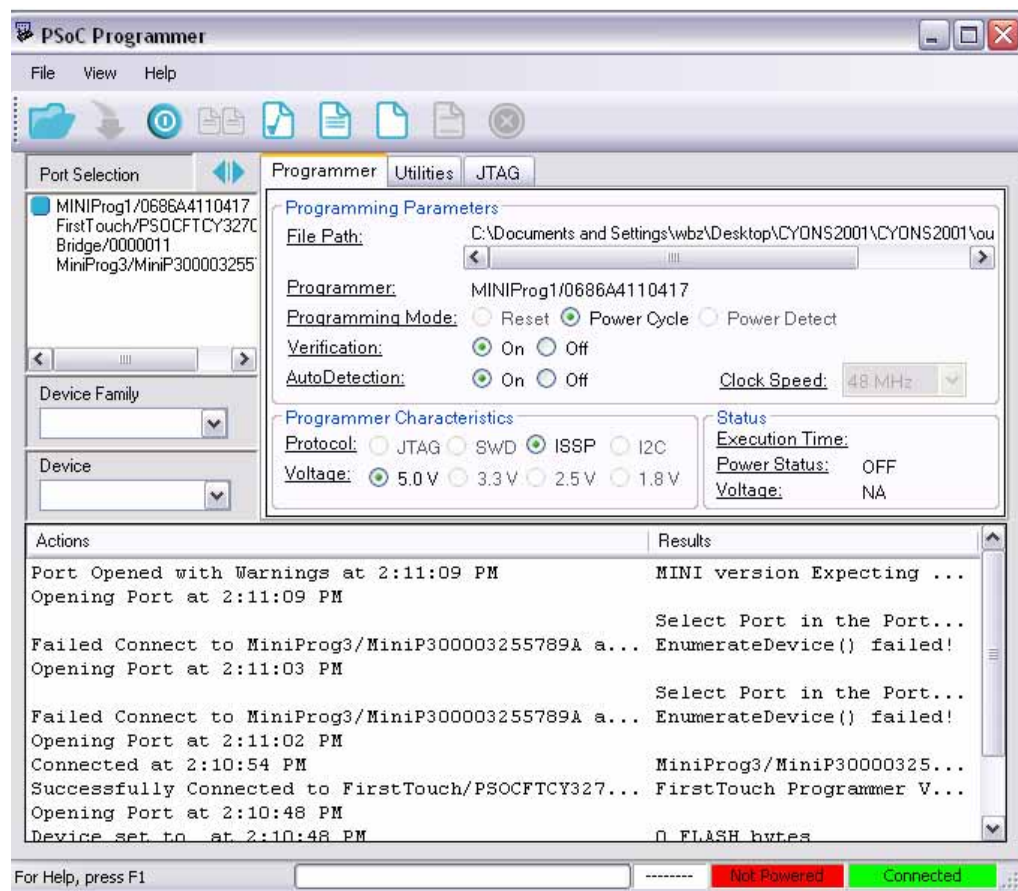
Use PSoC Programmer to open a HEX file, select a communication port, set a device, set a programming mode, program, verify, read, and run a checksum.

3.1 Starting Programmer

You can start PSoC Programmer from the Windows desktop or through PSoC Designer. Set up all hardware, including the device to program, before you start PSoC Programmer.

- To open PSoC Programmer from the desktop, click **Windows Start > Programs > Cypress > PSoC Programming > PSoC Programmer**.

Figure 3-1. PSoC Programmer in Modern View



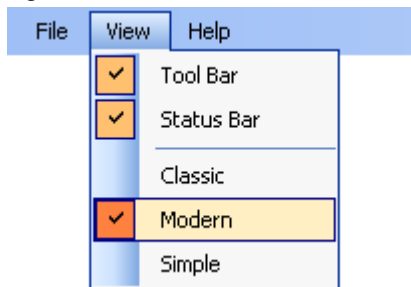
- To open the program from within PSoC Designer, load the target project that contains the HEX file and the device to program. Select **Program > PSoC Programmer** to launch PSoC Programmer.

3.2 Selecting a Skin

PSoC Programmer can be run as a standalone application or can be called as a COM object from other programs. The Programmer interface is flexible and can be presented from within other programs. There are several different interfaces that you can choose based on your needs and preferences and the needs of your program.

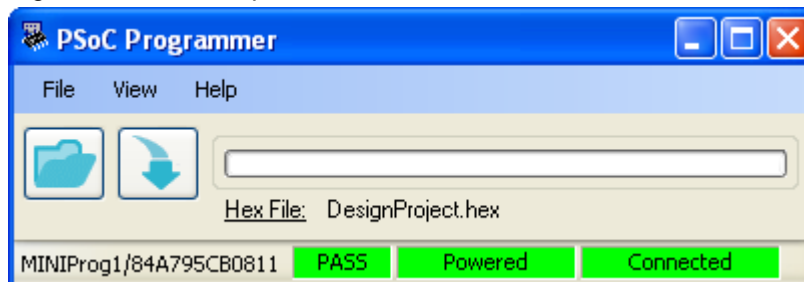
To choose a new skin, select a different skin from the **View** menu.

Figure 3-2. The View Menu



- Classic: The same look and feature set as Programmer 2.3x. Some of the updated features of Programmer 3.x are not available in this view.
- Modern: This is the default and most feature rich view of the Programmer.
- Simple: Just the basics, load a hex file and program.

Figure 3-3. The Simple View



3.3 Using the Simple View

The simple view was designed to be called from another program that passes all configuration options to Programmer when it is invoked. To keep the interface simple, options for setting device family, device, power settings, and other options are hidden in this interface. If you would like to use the simple view as a standalone programmer, you must switch to Modern or Classic view to set these options. All options are retained when switching views.

3.4 Selecting a Port

To select a port, click the port you are using to connect to the programming device.

Figure 3-4. PSoC Programmer Port Selection



- **USB/yywwDnnn** – The D implies a USB Adapter. Programming goes through the selected USB port to an ICE Cube.
yy = production year, ww = production work week, and nnn = serial number.
- **USB/yywwXnnn** – The X may be any letter other than D. X implies an ICE-Cube USB port. Programming goes through the USB port to an ICE to program a device.
yy = production year, ww = production work week, and nnn = serial number.
- **MiniProg** – XXXXXXXX. This version supports Miniprogram1 and Miniprogram3.
- **First Touch** – XXXXXXXXXX

When changing ports, PSoC Programmer attempts to connect to the selected port and displays the port status in the lower right corner of the window. If you were previously connected to a device on another port, PSoC Programmer will disconnect from the original device before connecting to the new device.

USB ports are added to the port list automatically when a programming device is connected and removed from the list when disconnected.

Setting a base and part device allows the programming operations to perform actions based upon the characteristics of the PSoC device. For example, CY8C24794 parts require Power Cycle Programming Mode because the reset pin is not available for Reset Programming Mode. Flash sizes are determined by selecting a PSoC device. Flash size is important when the verify operation is performed. Changing the device enables or disables Acquire Mode options and display Flash size information in the status window.

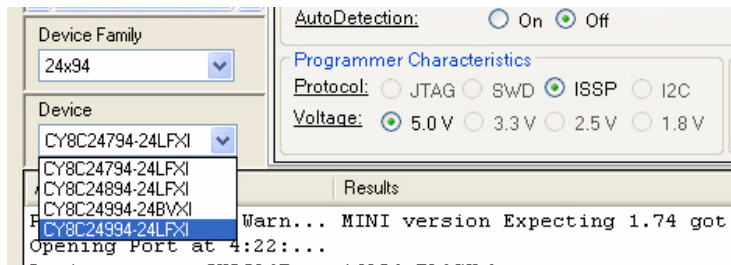
To select a device:

By default, PSoC Programmer is set to AutoDetect the device. Programmer will query the device and set the device based on the result. You can just click the Program button when you are ready to program and the proper device will be selected.

To select a device with AutoDetection Off:

1. Click the **Device Family** drop down list and select the target device family.
2. Click the **Device** drop down box and select the target device associated with the target device family.

Figure 3-5. PSoC Programmer Device Selection



3.5 Selecting a Programming Mode

Programming Mode determines how PSoC Programmer acquires the device for programming. There are three modes:

- **Reset** – Used for ISSP header programming on a self-powered target application board. In this mode, the target board supplies the power and the programmer uses the reset pin to acquire.
- **Power Cycle** – Used for programming when the programmer requires power. The programmer cycles power to acquire.

Select the Power Device check box if your target board is not self powered.

You cannot use the Reset Programming Mode on devices that do not have XRES pin.

- **Power Detect** –Used for programming when the programmer detects the power applied to the board. Available for Minipro3 and CY3207ISSP H/W.

3.5.1 Clock Speed

Clock speed for Minipro3 is selectable if you use JTAG Programming Protocol. The selectable clock speeds are 48Mhz, 24Mhz, 16Mhz, 12Mhz, 8Mhz, 6Mhz, 3.2Mhz, 3.0Mhz, 1.6Mhz, and 1.5Mhz.

3.6 Programming Characteristics

Depending on the Programmer capabilities the user can select various protocols.

Some programmers are single protocols, but others allow you to select different protocols. The Device Family and Device drop down adjusts according to the protocol selected and the device to be programmed. The following protocols are available:

- JTAG (JTAG programming protocol)
- SWD (Serial Wire Debugging)
- ISSP (In System Serial Programming)
- I2C (USB-I2C Bridge)

Programmer specific supplied voltages are:

- CY3215: 5V, 3.3V
- CY3270/1: 5V
- CY8CKIT-003: 5V
- CY3240: 5V, 3.3V
- Minipro1: 5V
- Minipro3: 5V, 3.3V, 2.5V, 1.8V

3.7 Selecting a HEX File

You must load a hex file into PSoC Programmer before programming a device. PSoC Programmer only programs devices using hexadecimal files (*.hex). If your project is not yet compiled into hexadecimal format, use PSoC Designer to prepare your project for programming before continuing.

To select a file for programming:

1. Click **File Load** or press [F4].
2. In the Open dialog box, browse to the folder containing the file, then select a file.
3. Click **Open**.

Programmer responds with a success message:

Active HEX file set at 10:35:08 AM | C:\Documents and Settings\Admin...

3.8 Programming a Device

You must load a HEX file into PSoC Programmer in order to program a device.

To program a device:

1. Load the HEX file.
2. Click **Connect**.
3. Click **Program** or press [F5].

The program operation erases, programs, verifies, protects, and performs a checksum. The verify is performed before the protect action so all blocks are verified.

3.8.1 Turning Verification Off

When you are debugging your program you may be making changes, rebuilding, and reprogramming a device very frequently. To save some time during this process, you can select to turn the Verification stage off. This saves roughly 30% of the total programming time. You should not turn Verification off for production programming.

The verification radio buttons "On" and "Off" will not be available when you use Minipro3 to program a PSoC3 device. The feature is disabled for PSoC3 devices.

3.8.2 Verify Programming

To verify device programming click **Utilities > Verify** or press [F8]. This is different from the verification done automatically during programming, as protected blocks are not verified. If the device is read protected the verify operation fails. On completion, PSoC Programmer specifies the number of protected blocks.

The results of the verify procedure fill the text window, flowing up from the initial operation command. To save or copy the results right click the text window and select Copy or Save As from the drop down menu.

3.9 Upgrading Firmware

Firmware for programmers must be updated to support new and updated PSoC devices and to assure that all of the latest bug fixes have been applied.

When PSoC Programmer starts, or when a different port is selected, Programmer checks the connected programming device firmware. If your device firmware is outdated, you will receive a warning similar to the following:

```
Port Opened with Warnings at 3:13:27 PM MINI version Expecting 1.74 got 1.67
```

This indicates that the attached MiniProg requires an update.

To update the firmware on your programming hardware select **Utilities > Upgrade Firmware**.

The firmware update process begins. The following message indicates a successful upgrade.

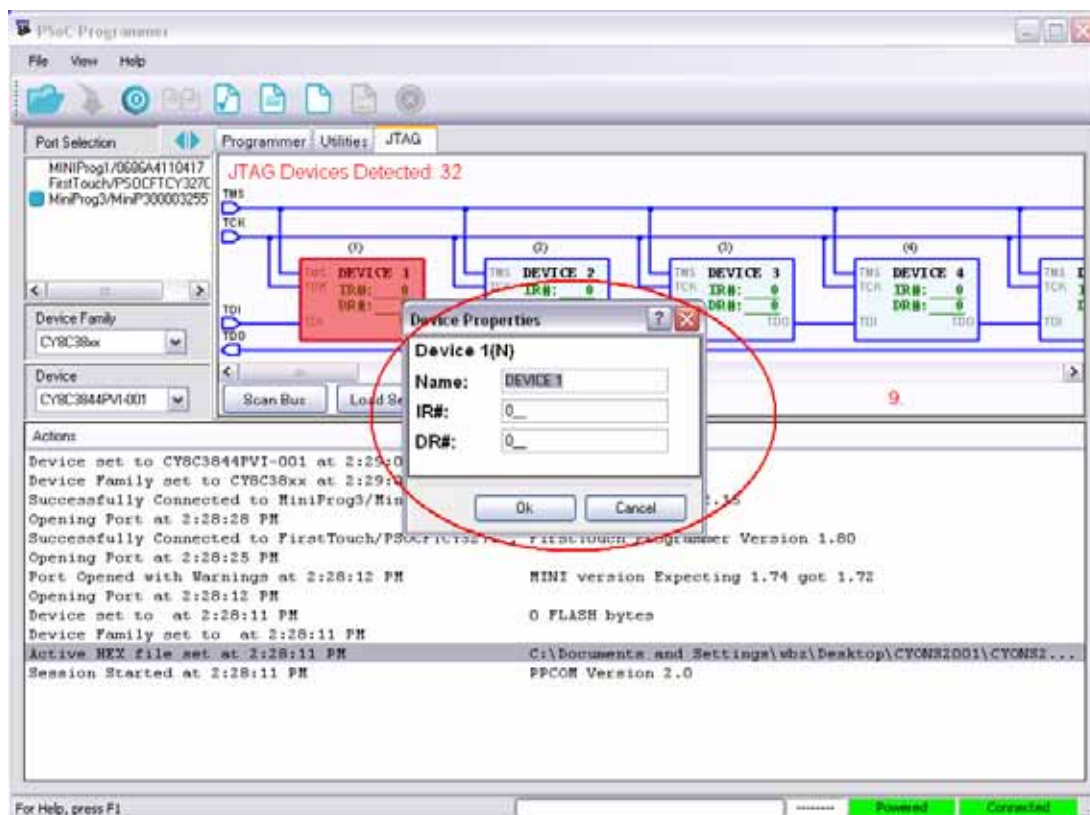
Firmware Update Finished at 3:26:05 PM	MINI Version 1.74 Succeeded Verifying... Upgrading... Initializing...
Firmware Upgrade Started at 3:25:46 PM	
Firmware Upgrade Requested at 3:25:46 PM	

3.10 JTAG Programming Protocol

The JTAG window shows the number of JTAG devices connected in serial. It also displays visual description of these devices.

- When a Cypress device is connected, the shaded square is populated with appropriate information
- A non Cypress device allows you to place the critical IR and DR device information.
The Device Properties window is displayed if you click the device within the JTAG display window. You can enter the crucial IR and DR identification information and the device name. The IR and DR values are in the range of 1 to 128.
- Each device icon is selectable and you can program the selected target device using the programming button.

Figure 3-6. Setting Device Properties



3.10.1 Serial Programming Features

Scan Bus – You can use Minipro3 to scan the available device connections. The display window updates the current configuration.

Load Setup – You can load the display information from a .jtc file.

Save Setup – You can save the display information into a .jtc file. This file captures all setup information, which enables you to perform additional work and retain the setting.

3.11 Aborting a Process

Programming and other long processes can be aborted.

The Abort Process button is enabled only during the busy state of PSoC Programmer. The busy state means that programmer is executing a long lasting action such as Program, Verify, Checksum, Read, and Upgrade Firmware. You can click the Abort Process button at any time during a busy state. This will abort execution of the current operation.

This is most useful when you click Program when a PSoC device is not connected to the programmer or when attempting to Acquire a device using the Reset mode, when the device is not powered. The Acquire operation takes about 20 seconds to time out. Use the Abort process button to avoid waiting for timeout.

If you opt to abort the process of programming the chip's flash contents, the chip could be in an unknown state. In such a scenario, please reprogram, else the device will fail in execution.

3.12 Read

Click Read or press [F7] to read the contents of a device. Device contents are displayed in hexadecimal, as shown:.

Read Finished at 11:20:25 AM

```
0000: 7d 7f 9a 30 30 30 30 30 7e 30 30 30 7e 30 30 30
0010: 7e 30 30 30 7e 30 30 30 7e 30 30 30 7e 30 30 30
0020: 7d 7e 77 7e 7d 7d d0 7e 7e 30 30 30 7e 30 30 30
0030: 7e 30 30 30 7e 30 30 30 7e 30 30 30 7e 30 30 30
0040: 7e 30 30 30 7e 30 30 30 7e 30 30 30 7e 30 30 30
0050: 7e 30 30 30 7e 30 30 30 7e 30 30 30 7e 30 30 30
0060: 7e 30 30 30 7e 30 30 30 30 30 30 30 30 30 30 30
0070: 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30
0080: 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30
0090: 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30 30
```

Flash Security data is displayed along with the read values in the PSoC Programmer Results window as shown. Unprotected blocks are displayed as 'U'. Protected blocks are displayed as 'xx'. Refer to the *PSoC Designer IDE Guide* for information about protecting Flash.

--- Flash Security Data ---

```
0000: U U U U U U U U U U U U U U U U
0400: U U U U U U U U U U U U U U U U
0800: U U U U U U U U U U U U U U U U
0c00: U U U U U U U U U U U U U U U U
1000: U U U U U U U U U U U U U U U U
1400: U U U U U U U U U U U U U U U U
1800: U U U U U U U U U U U U U U U U
1c00: U U U U U U U U U U U U U U U U
2000: U U U U U U U U U U U U U U U U
2400: U U U U U U U U U U U U U U U U
2800: U U U U U U U U U U U U U U U U
2c00: U U U U U U U U U U U U U U U U
```

3.13 Checksum

Click Checksum or press [F6] to perform a checksum operation on a device. If a HEX file is loaded, device values are compared to the loaded file. Read and Checksum operations may be completed without a loaded HEX file.

3.14 Erasing Flash

The Flash on the device attached to the programmer can be erased completely, or block by block.

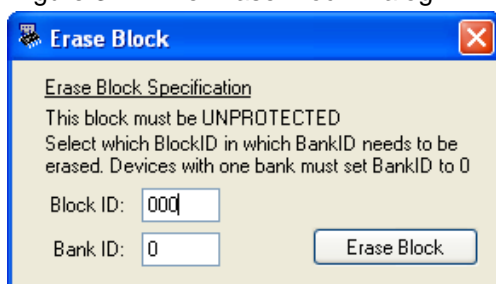
3.14.1 Erasing a Block

To erase a block, the Flash security for the block must be set to U, unprotected. Refer to the *PSoC Designer IDE Guide* for information about protecting Flash.

To erase a block of Flash:

1. From the Utilities menu, select **Erase Block**.
2. Enter the Block ID and Bank ID of the block you would like to erase.
3. Click **Erase Block**.

Figure 3-7. The Erase Block Dialog



If the operation succeeds, you will see “EraseBlock Succeeded” in the Results area. Otherwise you will see a specific error message.

3.14.2 Erasing the Entire Flash Contents

To erase all Flash content, Select **File > Erase All** or press [F9]. The Erase All function calls the EraseAll supervisory function which performs a series of steps that destroys the user data in the Flash banks and resets the protection block in each Flash bank to unprotected.

3.15 Patch Image

You can load a hex file and connect the Minipro1 to the target devices. PSoC Programmer reads the Flash content on the target device and compares it with the selected Hex file. Then, the PSoC Programmer replaces the Flash blocks which differ. This feature is useful to replace calibration data or a manufacturing number. Please see the PSoC Programmer COM user guide and code examples in the root installation folder for more information on writing unique applications to complete specific tasks.

3.16 Updating PSoC Programmer

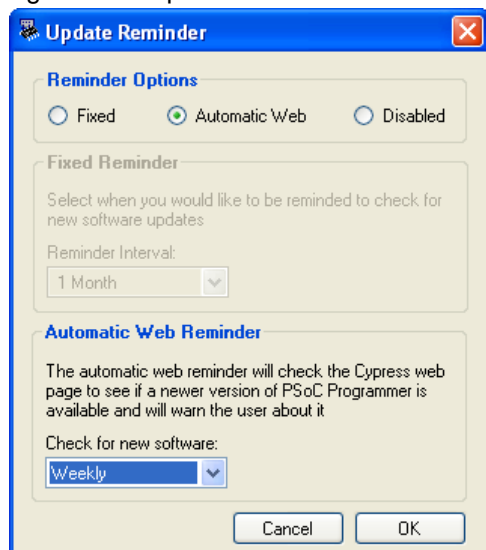
Programmer is updated frequently. Programmer updates contain support for newer Cypress devices and also address bug fixes and feature enhancements. You should check for updates frequently to make sure you have support for all devices and any available bug fixes.

To check for updates, go to the Programmer web site at cypress.com, or select **Utilities > Check for Update**. To check your version of PSoC Programmer, select **Help > About PSoC Programmer**.

When you first install PSoC Programmer, you are presented with a dialog that allows you to set the frequency of reminders. You can disable the reminders if you want to, but if you disable reminders

you should check for update periodically so that you are always using software that supports the newest PSoC devices and contains all bug fixes and enhancements.

Figure 3-8. Update Reminder



To change your update preferences:

1. From the Utilities menu, select **Update Reminder**.
2. Choose an update Reminder Option:
 - ❑ **Fixed:** Reminds you periodically to check for new software. With this option, the software reminds you to check the web site, and you must manually check for updates.
 - ❑ **Automatic web:** Checks the Cypress website periodically when Programmer starts, and prompts you to update if an update is available.
 - ❑ **Disabled.** Programmer will not remind you to check for updates. You should check for updates manually periodically.
3. Click **OK**.

Note: If you select the **Fixed Reminder** option, please know that there may not be an update for PSoC Programmer currently available. Please reset the reminder interval under the Fixed reminder, switch to an automatic web update, or disable the update reminder. Close and restart PSoC Programmer to reset the notification in the banner and in the status window.

3.17 Advanced Information

PSoC Programmer provides you a COM interface to generate specific applications. In the PSoC Programmer root installation directory the folders, Examples and Documentation, contain all the information to create unique applications with the PSoC Programmer COM.